

May 1, 1962

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3,031,699

SOCKET TYPE THREADING DIE HOLDER WITH WORK GUIDE MEANS

Filed March 24, 1959

2 Sheets-Sheet 1

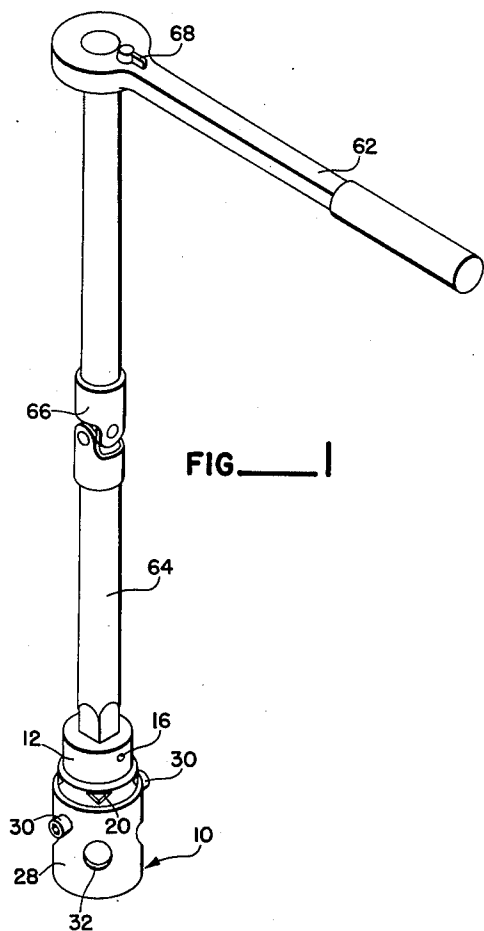


FIG. 1

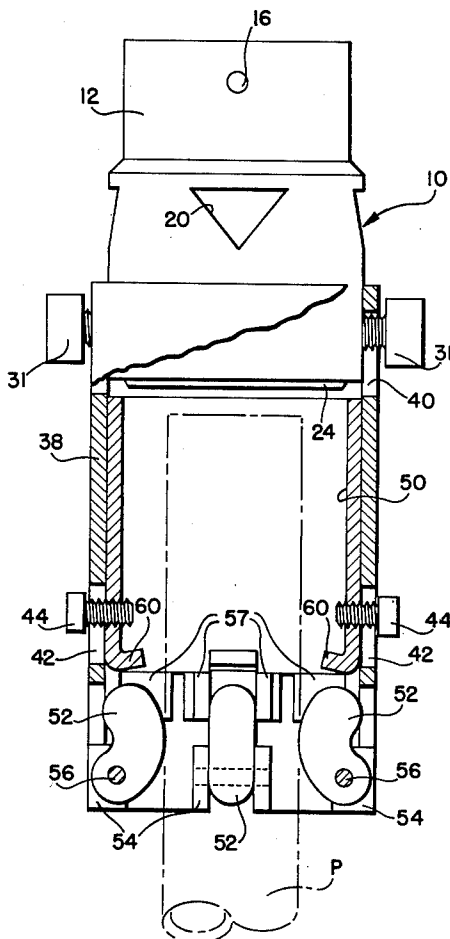


FIG. 2

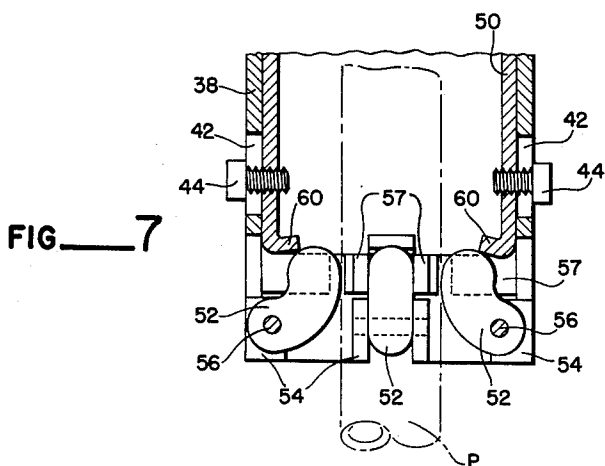


FIG. 7

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FIG. 3

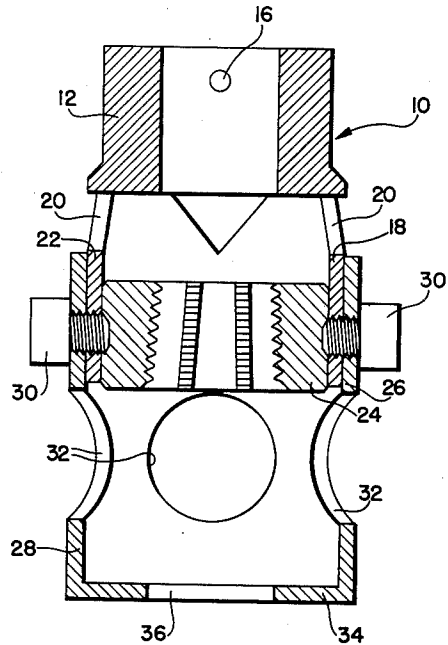
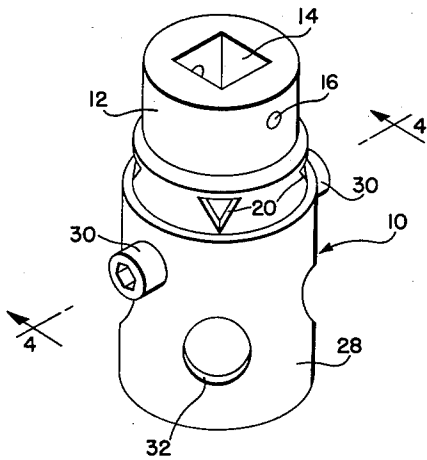


FIG. 4

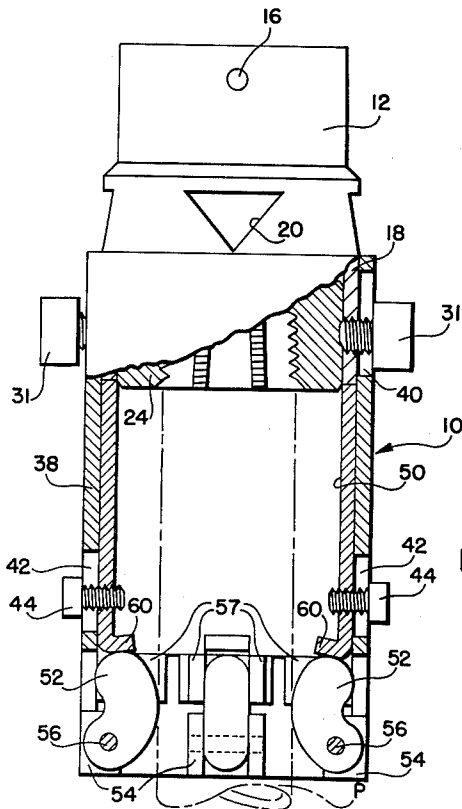


FIG. 5

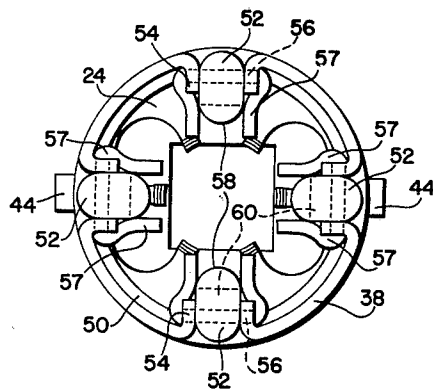


FIG. 6

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3,031,699 SOCKET TYPE THREADING DIE HOLDER WITH WORK GUIDE MEANS

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Filed Mar. 24, 1959, Ser. No. 801,661
1 Claim. (Cl. 10—127)

This present invention relates to the general art of pipe and bolt threading devices and more particularly to a threading die holder for use in places of difficult access and which will conform to the general form of socket wrench equipment to the end that it may be used with ratchet wrenches directly or through the medium of extension rods, universal joints and the like.

In the production of modern machinery, there is an increasing emphasis on having machines made in their most compact form. This design principle conserves valuable space in boats and vehicles and in various machine installations. Normally compact equipment is achieved only at the expense of placing the various elements of machines, power plants or the like very close together making it very difficult to use the older style conventional wrench. As a result of this compactness of design, many forms of socket wrench sets have been produced and they serve very well for the tightening, removal or replacement of nuts, cap screws and the like. There are many instances, however, where it becomes necessary to retread machine parts, such as pipe, bolts or studs that are anchored in place and to do this from a remote position. It is to supply this general need that this present threading die holder has been produced.

The principal object of this present invention is to provide a threading die holder, which makes use of socket wrench parts in order to engage parts to be rethreaded, and which are of too difficult access to engage with normal threading means.

A further object of this invention is to provide a tool holder having the general form characteristics of a wrench socket member, and which provides work piece guide means removed a working distance away from a metal cutting tool.

A further object of this invention is to provide a guide means for a socket type tool holder, which may be adapted to various sizes of rods or pipes.

Further objects, advantages and capabilities will be apparent from the description and the disclosure in the drawings or may be comprehended or are inherent in the device.

In the drawings:

FIGURE 1 is a general assembly view, in perspective, illustrating one form of joining a plurality of socket wrench parts with this present socket type threading die holder.

FIGURE 2 is a vertical view, on an enlarged scale, of this die holder, in its preferred form, with certain parts broken away and showing the use of this present equipment as adjusted for a maximum diameter pipe or rod stock.

FIGURE 3 is a perspective view showing the general appearance of the simpler form of this present tool.

FIGURE 4 is a vertical cross sectional view on an enlarged scale, over FIGURE 3, showing the relationship of the various parts involved in this simpler form of my device.

FIGURE 5 is an elevation broken away in part and sectioned showing the form of die holder of FIGURE 2 but showing the same with the centering cams in their backed up or using positions.

FIG. 6 is a bottom plan view of the device of FIGURE 5.

FIGURE 7 is a fragmentary, vertical, sectional view

of the tool, as shown in FIGURE 2, but illustrating the cams engaging a smaller diameter work piece.

Referring more particularly to the disclosure of the drawings, the numeral 10 designates generally my die or tool holder. Die holder 10 is composed of a number of coacting parts, which are supported in their operational position by driving hub 12. Hub 12 is provided with a driving wrench opening 14 of a type conforming to the usual socket members, as supplied on components of ratchet wrench sets of the type usually employed in automotive work and similar pursuits. This may be supplied with the usual spring detent means 16 to hold the socket unit onto the driving end of a ratchet wrench or any of the various extension members used therewith. Secured to driving hub 12 is the hub skirting 18. This skirting is normally provided with a plurality of lubricating and inspection openings 20 disposed around the periphery of the skirting next to the hub. The principal portion of skirting 18 is formed as a cylindrical tube 22, the inner surface of which is proportioned to fit any cutting tool used with the device, such as the threading die 24. The outer surface of the cylindrical portion of the hub skirting is adapted to receive the upper tubular portion 26 of the guide sleeve 28.

It is desirable to have the guide sleeve slotted, as shown at 40, and to employ one screw 30 to lock the die in operating position, without locking sleeve 38. Sleeve 38 may be adequately locked with the other screw 30, and this gives longitudinal adjustment of sleeve 38, without disturbing the die. Such movement of sleeve 38 controls clearance and also provides a stop means to insure equal threading of a plurality of work pieces.

A plurality of suitable assembly screws 30 are employed to hold the hub skirting, the threading die and the guide sleeve together in their operational position, as indicated in FIGURE 4. The body portion of guide sleeve 28 is provided with a plurality of inspection and oiling openings 32 so that, when conditions permit, the positioning of the die, with respect to the work piece, may be observed and adequate lubrication is provided.

It is desirable to provide guide means to insure substantially axial alignment of the threading die and the work piece. A simple form of such means is to provide a guide plate 34, secured at the free end of said guide sleeve and normally to the longitudinal axis thereof. This plate is provided with an axially disposed guide opening 36. The diameter of this guide opening should be just a guiding fit on the work piece P. It is desirable to be able to change the size of the guide opening and, in this form of this device, it is necessary to change the entire guide sleeve 28.

Referring to FIGURES 2, 5 and 6, a modified form of this tool or die holder is illustrated in which movable cam members are used to provide for the accurate centering of the holder on a work piece, without the necessity of changing the guide sleeve. In this modified form, the hub member 12 is identical with that of the simpler form of the tool shown in FIGURES 3 and 4 and the manner in which the tool, as a threading die 24, is secured is also the same. In this form, however, it is desirable to use headed guide sleeve positioning screws, which are not essential in the simpler form, if no slots 40 are used. These are required in the modified form, as the guide sleeve 38 is slotted at 40 and the headed screws 31 must be able to override the margins of the slots in order to adjustably position the guide sleeve longitudinally, with respect to the hub skirting 18. Guide sleeve 38 is further slotted around its lower periphery, with the slots 42, which guide on the fixed guide and locking screws 44, which are preferably secured to the cam follower sleeve 50. Slots 42 and the associated screws 44 are particularly desirable when the sockets and sleeve members 12, 38 and

50 are produced as stamping or formed tubing. They are also desirable when the pressure, applied to the cutting tool or die 24, is considerable, as they insure a positive positioning of all parts during periods of use.

Adjacent its lowermost end, guide sleeve 38 is provided with a plurality of cams 52, which are mounted for guidance and positioning in spaced lugs 54 and 54, formed in cam guide sleeve 38. Cam pivots 56 pass through the cams and are secured within the two lugs 54. To further position cams 52, when used on small diameter work pieces, as shown in FIGURE 7 or on smaller pieces, the available portions of the lower wall of the cam follower sleeve 50, may be formed as additional guides 57. In order to have adequate guiding, it is necessary to have at least three cams 52, and a preferred form is four such cams, as shown in FIGURE 6. It is to be noted that cams 52 are preferably provided with curved engaging surfaces as 58 to the end that they will slide easily around the surface of the work piece P.

The cam follower sleeve 50, normally is aligned with hub skirting 18 so as to give it adequate security against longitudinal upward movement, when it is under pressure from cams 52. Formed at the lower margin of the cam follower sleeve 50, are cam followers 60. These are preferably inclined upwardly, as viewed in FIGURE 5, so as to provide a sloping surface, which tends to urge the centering cams 52 toward the center or axis of the die holder assembly 10.

As will be noted by reference to FIGURE 7, when the diameter of the work piece is appreciably less than the form shown in FIGURE 5, the centering cams revolve about the cam pivots 56 so as to engage the outer surface of the smaller work piece. When this occurs, it is quite important that the cam followers are in engagement with all the cams to insure that all the points of contact between the centering cams and the work piece are disposed at equal distance from the longitudinal axis of the work piece P, thus assuring adequate centering of the die holder on the work piece.

Mode of Using Tool

In using this tool, it is normal for the work piece to be fixed in position, which requires that the tool be passed over the same. Reference is made to FIGURES 2, 5 and 7. In FIGURES 2 and 5, a capacity sized work piece is being entered in the guiding means, thus forcing the cams 52 to revolve about pivots 56 to their maximum. In FIGURE 7, the guide sleeve has been moved upwardly carrying with it the cams 52, which first contact the work piece and then cam followers 60. The cam followers are carried upwardly until the cam follower sleeve 50, engages hub skirting 18. The headed assembly screws 30 are now tightened and the device is locked, ready for continued use. As the cam followers 60 are all at the same level, the entering cams are all extended an equal amount and the die is centered on the work piece.

In using this tool, it is normally contemplated that this arrangement would be of the greatest use when the work piece cannot be reached by dies held in the conventional die holder. However, for the mechanic, who may not wish to be burdened with excess equipment and who of necessity must be provided with a socket wrench kit, it

will be believed apparent that the ratchet wrench would be directly engaged in wrench receiving opening 14 to provide a very compact tool of general utility. For general usage as intended, however, die holder 10 normally would be at some distance from the operating means as the ratchet wrench 62 and one or more extension rods as 64 and 65 might be employed especially where it is necessary to employ a universal joint 66. A ratchet wrench, as indicated in FIGURE 1, is the ideal means of turning the die which, as its name implies, is provided with a two-way ratchet controlled by pawl member 68 so that the threads may be cut and the die backed off the threads to release and remove the tool. The ratchet wrench has the same facility, as the die holder, of being usable in limited quarters, particularly in corners and the like where no form of double ended crank, after the fashion of the conventional tool holder, could be employed.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction for a socket type threading die holder.

Having thus disclosed the invention, I claim:

A socket type threading die holder, comprising: a driving hub, adapted to be engaged in driving relationship by a driving element of a socket wrench set; a hub skirting secured to said hub in axial prolongation thereof and having an axially aligned internal bore adapted to receive a threading die; a threading die operatively disposed in said bore and having a depression to receive a positioning screw; a guide sleeve adapted to engage the outer surface of said skirting and extend in axial prolongation thereof; a guide means consisting of a plurality of centering cams pivotably secured to said guide sleeve and disposed for radial rotation; a cam follower sleeve slidably disposed within said guide sleeve, having cam followers secured thereto; said cam followers disposed in a plane normal to the longitudinal axis of the die holder and adapted to position the contact points of said cams and a work piece at the same distance from the longitudinal axis of said die holder; a plurality of headed positioning screws, threadedly engaging said skirting, passing through slots in said guide sleeve and one of said screws coming to rest in the depression of said threading die and position it against movement, slots in said guide sleeve for receiving screws, tapped holes in said cam follower sleeve aligned with said slots in the guide sleeve, and screws passing through the slots in the guide sleeve and into the tapped holes for firmly positioning the guide sleeve and the cam follower sleeve with respect to each other.

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